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ABSTRACT

A study investigated the relationships among trait argumentativeness (one's disposition to either approach or avoid an argument), argumentative flexibility (one's disposition to argue in either a flexible or collaborative manner, or an inflexible manner), and self-reported perception of critical thinking dispositions and their impact on critical thinking competence and social tolerance. Subjects, 90 students enrolled in an Introduction to Communication Theory course at the University of Missouri-Kansas City, completed 2 surveys which included the California Critical Thinking Disposition Inventory test, the Trait Argumentativeness Scale, measures of social tolerance, the Watson-Glaser Critical Thinking test, the Argumentative Flexibility Scale, and several demographic-type measures. Results demonstrate a partial support for the effects of argumentative style, in particular trait disposition toward arguing. Findings suggest that caution should be exercised when using standardized tests to evaluate practical thinking ability when solving social disputes. (Contains 30 references and 4 tables of data.) (Author/RS)

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An Investigation of Variables that Define Collaborative and Critical Thinking: The Effects of Argumentative Style on Critical Thinking Competence and Social Tolerance

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ABSTRACT

The present study investigated the relationships among trait argumentativeness (i.e., one's dispositions to either approach or avoid an argument), argumentative flexibility (i.e. one's disposition to argue in either a flexible or collaborative manner, or an inflexible manner) and self-reported perception of critical thinking dispositions and their impact on critical thinking competence and social tolerance. Results demonstrate a partial support for the effects of argumentative style, in particular trait disposition toward arguing. Findings are then interpreted in a discussion of critical thinking within the context of interpersonal argument.

An Investigation of Variables that Define Collaborative Critical Thinking: the Effects of Argumentative Style on Critical Thinking Competence and Social Tolerance

INTRODUCTION

The pace of the world quickens and the pressure to respond intensifies. The realities of education, business, and the human condition have become increasingly complex and will, in the 21st century, become moreso, all the while revolving around a constant and accelerating condition of change. What qualities of thinking will be necessary for effectively dealing with that change?

Robert Reich makes some astounding predictions about the workforce of the 21st century in his seminal book, The Work of Nations(1993). Reich determines four types of thinking needed for successful adaptation to the world of work, both now and in the future. They are: 1) abstraction, 2) system thinking, 3) experimentation and testing and 4) collaboration. Reich gives the name "symbolic analyst" to the critical thinker in possession of these traits.

Abstraction involves systematically seeking causes where the whole becomes more important than the parts. Systems thinking involves the critical understanding of how problems develop and the creation of multiple solutions. Experimentation focuses on the independent thinker who routinely assesses their own thinking, and collaboration is the core of teamwork ability needed to address complex problems in a world of constant change.

The determination of our national fate may well depend on our ability to be intellectually humble and flexible, to learn to think in alternative points of view, to work with others on long range solutions to problems. From the world of business and economics, Lester Thurow (1992), Robert Heilbroner (1992) and John Sculley (1992) all recognize that the world of the future is a world where flexible and critical thinkers will enjoy both power and advantage because of their abilities.

Defining Critical Thinking and Collaborative Learning

In the current highly profiled literature on critical thinking, definitions vary in breath and inclusiveness. Broadly conceived, critical thinking concerns itself with disciplined inquiry, problem solving and decision making (Ennis, 1985). Restricted idiomatic interpretations also

emerge from the critical thinking literature. One such conventional acceptance is the use of cognitive processes within informal logic, including appraisal and evaluation (Watson-Glaser, 1980). Other constructions apply "the appropriate use of reflective skepticism within the problem area under consideration" (McPeck, 1981, 7) or the ability to reach sound conclusions based on observation and information (Paul, 1988). Beyer (1983), defines it as the ability to assess the authenticity of knowledge, beliefs or arguments and O'Neill (1985), sees it as the ability to distinguish bias from reason and fact from opinion. Ruggerio (1988) views critical thinking as two-phased and calls his definition holistic thinking. The scope of critical thinking varies from one scholar to another, and is merely a label given to a "complex of many considerations" (Norris, 1985). Since critical thinking can be defined in a number of ways, it is useless to insist one definition is universal. What *is* useful is to look for consistencies in the myriad of definitions and to accept all definitions as a scaffold upon which to build a consensus.

Critical thinking definitions, in the collaborative sense, are proposed by Sternberg, and Brookfield, Shor and Freire. Sternberg (1983) claims that critical thinking skills, no matter how highly developed, are useless unless one has a "critical spirit" which includes a willingness to apply critical thinking to world situations. Brookfield (1987) is concerned

with critical thinking in the workplace and in political life and Shor (1987) sees critical thinkers as initiating change , not only in their own lives but in society as well. Freire (1989) stresses the dialectic between critical thinking and dialogue. Freire elaborates that "only dialogue, which requires critical thinking, is also capable of generating critical thinking. Without dialogue, there is no communication. and without communication. there can be no true education" (80-81).

Collaboration, as defined by Websters Ninth New Collegiate Dictionary is "to work jointly with others or together especially in an intellectual endeavor" (259). Collaborative learning assumes that "knowledge is a consensus among members of a community of knowledgeable peers" (Bruffee, 1993,3). Collaborative critical thinking is defined as working together in a joint intellectually disciplined effort of conceptualizing, analyzing and evaluating information where the process of mutual debate is preserved by providing a forum through which disagreement is honored and problem solving is consensual. As Leon Botstein, president of Bard College suggests, "the lesson we should be teaching (students) is that there is a place left in the civilized world where people actually disagree, see the other point of view, and then honor disagreement" (1990, 30). Christopher Lasch, the noted social critic (1990) contends that democracy is fueled, not by information alone, but

by conceptualizing, analyzing and evaluating information where the process of mutual debate is preserved by providing a forum through which disagreement is honored and problem solving is consensual.

The Role of Argument in Critical Thinking and Collaborative Learning

In an effort to identify specific qualities in the development of collaborative critical thinkers, this research seizes on the unexamined area of argumentative flexibility. Argumentative flexibility has recently been identified as one variable contributing to collaborative problem solving. Neer (1994) determined that flexible arguers actively seek alternative points of view in an issue, hold multiple opinions, and examine viewpoints to which they are either unfamiliar or opposed when arguing the content of an issue. Further, flexible arguers were found to encourage others to express their opinions, and acknowledge the validity of another's position on an issue (19).

Argument theorists, in both the Philosophy and Communication disciplines have long invested much effort in teaching students the critical thinking skill of developing, analyzing and dissecting arguments. Recent research in argument theory (Infante,1993) explores how argument topics relate to argumentativeness and suggests implications

for the interactionist approach to communication. Other studies (Infante, 1988; Roloff, Tutzaur, and Dailey, 19889; and Pruitt, 1981) demonstrate that constructive argument, such as that proposed by Botstein and Lasch, is more likely to lead to cooperative or collaborative outcomes than destructive argument. Characteristics of what is considered a constructive argument have one common thread and that is a considerable degree of flexibility is required in making an argument and in responding to the arguments of others (Neer, 1994). Wenzel (1990) refines the discussion by indicating that unless arguers bring "attitudes of the right kind" (i.e. honored disagreement as argumentative flexibility) to an argument, no critical discussion can be insured.

The present study investigated the relationships among trait argumentativeness (i.e., one's dispositions to either approach or avoid an argument), argumentative flexibility (i.e. one's disposition to argue in either a flexible or collaborative manner, or an inflexible manner) and self-reported perception of critical thinking dispositions and their impact on critical thinking competence and social tolerance.

METHOD

1. Participants and Design. Participants were 90 (Female = 53, Mean Age = 22.10) enrolled in an introduction to communication theory course at the University of Missouri - Kansas City during the 1995-1996 academic year. The course serves as a humanities distribution course for students not majoring in Communication. Thus, the enrollment consists of students in the college of Arts & Sciences as well as students enrolled in several of the professional schools (e.g., Pharmacy, Medicine, Business). Participants completed two 25-minute surveys and received extra-credit for their voluntary participation in the study. The first survey included the California Critical Thinking Disposition Inventory (CCTDI) test, followed by a social tolerance measure on censorship and the Trait Argumentativeness Scale (TAS). The second survey was administered five weeks later and included the Watson-Glaser Critical Thinking test, attitudes toward abortion, a second social tolerance measure (reactions to President Clinton's nomination of Dr. Henry Foster as Surgeon General of the United States), the Argumentative Flexibility Scale (AFS), and several demographic-type measures, including media consumption. Dependent measures included the Watson-Glaser Critical Thinking test

and the two social tolerance measures. Analysis of the research questions were conducted with multiple regression.

2. Measures of Argumentative Style. The TAS is the most widely used measure of an individual's predisposition for either approaching or avoiding an argument. The TAS has been used in more than 50 published studies and well over 100 convention papers (Infante, 1981, 1988). Reliability estimates are well above .80 across those studies used the TAS; in this study the reliability of the scale was .87, (Mean = 66.56, SD = 11.40, Range = 20-100)) The AFS is a more recent attempt to measure an individual's tendency to argue in either a flexible or inflexible manner. The initial study in which the AFS was used yielded a reliability estimate of .80. In the current study, reliability was assessed at .79 (Mean = 61.10, SD = 6.10, Range = 20-100). The AFS is defined as a collaborative measure in this study because scale items that define the instrument clearly represent cooperative decision-making when arguing social issues. That is, the AFS measures degree of flexibility in both constructing an argument and in responding to the arguments of others. Indeed, several of the items that define the instrument focus on consensus-making ability when arguing social issues with others.

3. Measurement of Critical Thinking Competence.

Just as there are various descriptions and concepts of critical thinking, there are a variety of assessment instruments available with which to measure critical thinking. It is important to note that no single test assesses the variety of critical thinking skills previously identified.

The Watson-Glaser Critical Thinking Appraisal (Form A) (1980) is the most widely used critical thinking test currently available. It is designed to measure cognitive skills in five aspects of critical thinking: inference, assumption, recognition, deduction, interpretation and evaluation of arguments. Notably absent in this test are three other aspects: the judging of authorities, judging reliability of observation statements, and semantic skills. This study used two discrete areas of the test. They were assumption and interpretation. Reasons for using only two areas were time constraints and appropriateness of content material.

Test results from the Watson-Glaser Critical Thinking Appraisal (Form A) provide an estimate of critical thinking to two different kinds of content, neutral and controversial. The reliability of the test has been assessed by test scores over time. Internal consistency and correlation between scores have also been shown to be reliable. Split-half reliability coefficients on composite scores of college students have been reported in

the .70s range for the test as a whole (Sternberg, 1985). In the present study, reliability estimates of .79 and .76 were observed for the assumption (Mean = 9.45, SD = 3.82, Range = 1-16) and the interpretation components (Mean= 10.35, SD = 2.12, Range = 2-16).

The authors of the test suggest that to make the test results meaningful, "it is necessary to relate scores to specifically defined normative groups" (Watson-Glaser, 1980, p.4). Conceivably, a specific group of contemporary students attending an urban university in the 1990s may have a variety of approaches to critical thinking, only one of which rests on the bedrock of informal logic.

4. Measurement of Perceived Critical Thinking Competence

The California Critical Thinking Disposition Inventory (CCTDI) is an objectively scored standardized instrument which provides the means to measure attitudes, expectations and beliefs associated with the disposition toward critical thinking. The CCTDI is the result of a conceptualization of critical thinking which emerged from a two year Delphi research project sponsored by the American Philosophical Association (Facione, 1990). The panel of experts who designed this test were persons active in critical thinking, research, education and

assessment. According to the panel's conceptualization critical thinking is "purposeful self-regulatory judgment" based on conceptual cosiderations. Seven factors are presumed to dispose a person toward using critical thinking: they are; truth-seeking, open-mindedness, analyticity, systematicity, critical thinking self-confidence, inquisitiveness and maturity. Cronbach's alpha (internal consistency) reliability coefficients and factor analytic statistical analyses of responses to the pilot CCTDI administrations supported the existence of several common (but not necessarily discrete) factors in the disposition toward critical thinking. This instrument was used in order to identify dispositional elements toward critical thinking which the Watson-Glaser Critical Thinking Appraisal does not address. Using a summated scoring procedure, the CCTDI (alpha = .88) recorded a grand mean of 305.53 (SD = 31.11, Range = 240-360) with all test components yielding alpha reliabilities above .80. Factor analysis revealed that only 62 of 75 test items loaded on one of the seven factors produced. Thus, while the test is highly reliable, the internal structure of the test does not appear to yield test components that are as clearly defined as original testing of the CCTDI revealed.

5. Measures of Social Tolerance. Two measures of tolerance were tested. The first measure consisted of 10 items measuring attitudes toward censoring the recent Mapplethorpe art exhibition (e.g., all 200 pieces in the collection should be banned from public display and only the 20 pieces labeled as obscene should be banned), whether school prayer should be reintroduced in the public school system (e.g., I would support voluntary participation in a prayer selected by students or their family and I would support required participation in school prayer), and issues related to public education (e.g., college students should not be exposed to literary or political works that espouse anti-American ideas and high school students should not be exposed to literary or political works that do not support democratic and American ideas. The 10-item attitudinal set obtained a .75 alpha reliability estimate while each of the three composites received alpha estimates ranging from .65 to .72. The three attitudinal sets were derived through factor analysis with each set generating eigenvalues above 1.50.

The second social tolerance variable consisted of 12 items measuring reactions toward the nomination of Dr. Henry Foster as Surgeon General of the United States. Factor analysis resulted in three factors (each yielding eigenvalues between 1.2 and 2.1) with alpha estimates ranging from .68 to .77. The first factor was labeled "support for Foster" and

loaded 5 items (e.g., Foster should remove his name from consideration and His name should not be removed from consideration and the entire Senate should decide whether or not he should be confirmed). The second factor was labeled "disbelief or mistrust" that Foster was unaware of the implications of his previous abortion record and loaded four items (e.g., I find it difficult to believe that he forgot how many abortions he performed, regardless how many years ago they were performed and I think he just did not want to admit to the press and the public how many abortions he had actually performed). The third factor was labeled the "naive politician" and loaded three items (e.g., He probably thought his abortion record would not be a factor in his confirmation and Assuming he really did not remember his prior abortion record, no one should make a public statement without first checking his record).

6. Additional Predictors. Four additional predictors were tested in the study as mediators of the dependent or measurement variables. Gender and age of participants were examined because previous research in argumentative processes has determined that gender may mediate argumentative style. Age of participant was tested because of the unique urban setting of our university in which students range in age from 18 to over 50 with the median age of students at the university at approximately

26.0. A third predictor tested was participants attitudes toward abortion (alpha=.78), particularly as they may influence perception of the Foster nomination. Thus, abortion attitudes were believed to be potentially as predictive as one's argumentative style in determining social tolerance. A final predictor tested in this study was media consumption (e.g., number of hours spent reading the news and editorial sections of local newspapers, hours spent viewing TV news shows such as 60 minutes, and number of hours spent reading print news media such as Newsweek). Media consumption was tested on the assumption that an increase in familiarity of knowledge with social issues may increase both tolerance and understanding of the complexity of those issues.

Research Question 1: What effect will argumentative style, perceived critical thinking competence, gender, age, and media consumption have on critical thinking competence.

The first research question was based on the assumption that argumentative style (TAS, AFS) and perceived critical thinking competence would positively impact on participants critical thinking competence (i.e., ability to identify argumentative assumptions and ability

to interpret arguments leading to conclusions). Regression analysis revealed that none of the predictors impacted on critical thinking competence scores, as demonstrated by the Watson-Glaser Test composite ($R = .188$, $F(5,86)=1.31$, $p < .66$). Similar findings were observed with both the "interpretation" and "assumption" dimensions. In fact, none of the predictors were able to generate significant simple correlations as reported in Table 1. Media consumption was removed from the regression models because it failed to generate significant correlations with any of the measurement variables tested in this study.

Table 1

Predictors of Critical Thinking Competence

	Interpretation	Assumption	Composite Test Score
AFS	.01	.01	.02
TAS	.04	.06	.02
CCTDI	.15	.07	.13
Gender	.04	.12	.10
Age	.07	.09	.10

Research Question 2: What effect will the AFS, TAS CCTDI, gender, and age have upon social tolerance--as measured by attitudes toward censorship?

The second research question tested whether the same predictors reported above would impact on attitudes toward public exhibition of the Mapplethorpe art collection, reinstating prayer in the public school system, the use of anti-democratic literary and scholarly works in public school instruction.

Research question 2a. revealed that Trait Argumentativeness (TAS) functioned as the only predictor of censoring the Mapplethorpe collection ($R = .41$, $F(1,90) = 18.24$, $p < .001$). Argumentative flexibility was the only other predictor to generate a significant simple correlation, as results in Table 2 demonstrate. Research question 2b. failed to yield a significant regression equation ($R = .24$, $F(5,86) = 1.09$, $p < .37$) or a significant simple correlation, as reported in Table 2. Research question 2c. revealed that trait argumentativeness functioned as the only predictor of censoring literary and scholarly works in public school instruction ($R = .30$, F

(1,90) = 9.12, $p < .003$). The only other predictor to yield a significant simple correlation was the CCTDI. The results demonstrate that high trait arguers (i.e., those who approach an argument as exciting, intellectual challenge) are opposed to censoring the Mapplethorpe collection and censoring literary works in public school instruction.

Table 2

Effects of Predictors on Social Tolerance (Censorship)

	Mapplethorpe	School Prayer	School Instruction
AFS	.24	.07	.04
TAS	.41	.13	.30
CCTDI	.14	.16	.23
Age	.10	.08	.11
Gender	.04	.06	.01

Research Question 3: What effect will the AFS, TAS, CCTDI, age, attitudes toward abortion, and gender have on attitudes toward the nomination of the Surgeon General?

Research question 3 examined the three attitudinal composites derived through factor analysis. The first composite--support for Foster--($R = 44$, $F(3,88) = 7.16$, $p < .001$) was predicted by trait argumentativeness (zero-order $r = -.35$, standardized coefficient = -.30, $F = 9.09$, $p < .003$), attitudes toward abortion (zero-order $r = .28$, standardized coefficient = .20, $F = 4.07$, $p < .04$), and gender (zero-order $r = .18$, standardized coefficient = .19, $F = 3.90$, $p < .5$). These findings demonstrate that high trait arguers supported his nomination while females and participants holding pro-life attitudes were more likely to report that he should remove his name from further consideration as Surgeon General.

Although argumentative flexibility failed to enter the regression model, it yielded a simple correlation of .29 as reported in Table 3. The second composite--disbelief (that Foster was aware of his record and was simply attempting to hide his previous abortion record)--was singularly predicted by the TAS ($R = .23$, $F(1,90) = 5.17$, $p < .03$); that is, high trait arguers

were more likely to consider the possibility that Foster was not intentionally attempting to hide his record on abortion. Significant simple correlations also were observed for attitudes toward abortion and the AFS. The third composite--the naive politician--was predicted by only the TAS ($R = -.21$, $F(1,90) = 4.17$, $p < .04$) and indicates that high trait arguers were more likely to believe that Foster was simply naive about the impact his record would have on the nomination.

Table 3

Effects of Predictors on Social Tolerance (Foster Nomination)

	Support	Disbelief	Naive
AFS	-.29	-.19	-.16
TAS	-.35	-.23	-.21
CCTDI	-.14	-.05	-.02
Gender	.18	-.16	-.08
Age	-.04	-.15	.12
Abortion	.28	.21	.15

Note: Negative correlations (above .17, $p < .05$) indicate positive attitudes toward the Foster nomination.

Additional Findings

An interesting set of findings emerged yhat were not anticipated in this study. High trait arguers and high flexibility arguers each reported moderately strong pro-life attitudes (.27 and .32, respectively, $p < .01$) yet did not use these attitudes in weighing the Foster nomination. Additional regression models were defined to test for interaction terms (e.g., TAS x abortion attitudes, AFS x abortion attitudes); however, every model tested failed to generate simple correlations larger than those generated by main effect terms. A second finding of interest is that the AFS, TAS, and CCTDI were all highly correlated (see table 4) yet failed to generate interaction terms (e.g., AFS x CCTDI) which accounted for a larger amount of variance than the main effect regression models.

Table 4

Intercorrelations among Predictor Variable

	AFS	TAS	CCTDI	Gender	Age
AFS		.38	.26	.09	.16
TAS			.43	.01	.03
CCTDI				..01	.18
Gender					..01
Age					

Note: Correlations above .18 ($p < .05$) and above .24 (.01)

A final set of results are also of interest: reading the news and editorial sections of the local newspaper generated significance with both the TAS ($r = .25$, $p < .01$) and the AFS ($r = .23$) However, significance was not observed with any other media consumption variable (i.e., viewing the nightly national newscasts, viewing TV news serial programs, and reading the weekly or monthly news magazines).

DISCUSSION

Findings demonstrate that only the TAS consistently impacted upon measurement variables tested in this study; however, the impact of the TAS is limited to only measures of social tolerance rather than demonstrated critical thinking competence. The fact that none of the predictors mediated critical thinking competence raises several issues:

(1) Is the Watson-Glaser critical thinking test an adequate measure of critical thinking competence; that is, does the test reflect how one actually engages cognitive processes while analyzing an issue?

(2) Assuming the Watson-Glaser test is a valid measure of critical thinking competence, future studies should assess test components other than those tested in this study, and

(3) Any test assessing critical thinking competence, no matter how valid, must recognize the powerful role of interpersonal forces in shaping how issues are processed during the course of an argument.

In regard to the latter issue, both the AFS and TAS appear to focus on one's perception of how an argument unfolds in the interpersonal arena. For instance, the TAS focuses on an arguers perceived consequences of arguing with another person, how one will be perceived

by others, and one's perceived feelings of accomplishment. And, the AFS focuses on degree of openness and cooperation during an argument. Thus, each instrument is more focused on relational or interpersonal processes and outcomes of arguing and less focused on ability to argue effectively or think in a critical manner (although four of 20 AFS items do reference ability to view all sides of an issue).

Yet, there does appear to be an underlying cognitive component with each instrument as evidenced in findings for media consumption (i.e., high trait and high flexibility arguers report more consumption of new and editorial newsprint). Perhaps the strongest evidence that each instrument reflects an underlying critical thinking component lie in findings for social tolerance. In particular, high trait arguers (TAS) appear quite able to suspend immediate judgment of the Foster nomination in spite of their statistically significant pro-life attitudes.

What this study has not addressed fully is the question of what constitutes critical thinking competence--although we have shown that an individual may demonstrate social tolerance yet be no better able to identify argumentative assumptions and interpretations than individuals who do not demonstrate social tolerance. Thus, does critical thinking competence depend on skill at dissecting an argument or ability to set

aside one's attitudinal predispositions when arguing an issue, or both? This may be one of the issues central to determining the role of critical thinking competence in resolving social disputes; that is, does effective argument (i.e., critical thinking competence) translate into practical argument (i.e., resolving social disputes).

This study also has not fully addressed the role of collaborative argument. If the AFS is a collaborative scale, why did it not predict social tolerance as well as the TAS? One explanation is that the AFS is only a recent development and must undergo more stringent methodological rigor. A second, and perhaps better explanation, may be that flexibility is only one component underlying collaborative learning. That is, one may be committed to collaboration without necessarily doing so in a flexible or agreeable manner--especially if one believes that learning occurs when people disagree with one another rather than when they agree with one another.

Although the statistical findings in this study are not robust, it does indicate that caution should be exercised when using standardized tests (i.e. Watson-Glaser Critical Thinking Appraisal and the California Critical Thinking Disposition Inventory) to evaluate practical thinking abilility when resolving social disputes. Methodologies that use both

written and oral reports of thinking processes may be indicated here. In addition, further studies that interrogate interpersonal argumentative style with critical thinking ability may shed some light on the qualities necessary for developing the critical/collaborative thinker. If a combination of collaboration and critical thinking is required for success in the 21st century, then teachers must devise instruments that measure those qualities, and further, develop methodologies for encouraging them in the classroom.

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